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Social Communication Behaviors of Virtual Leaders

Daphna Shwarts-Asher

"Sarnat" School of Management, The College for Academic Studies, Israel
daphna@mla.ac.il

Abstract. More and more organizations are adapting the solution of e-teams - teams that can span distances and times to take on challenges that most local and global organizations must address. This experimental study examined leadership in the context of traditional teams using face-to-face communication and virtual teams using computer-mediated communication. The research question is which leadership functions are necessary to promote virtual team performance. A model, suggesting that leader communication behaviors mediate the relationship between "virtuality" and "team's outputs" will be presented, and a methodology to examine this model will be illustrated. The findings show that face-to-face team's output is partially superior to a virtual team's output, and that social communication behaviors of face-to-face leaders are positive than social communication behaviors of virtual leaders. Virtual team is a common way of working, and will expand in the future. Thus, the importance of the theoretical and practical implementation of the virtual leadership will be discussed.

Keywords: Virtual teams, leadership, communication behaviors, team performance.

1 Introduction

The number of virtual teams is increasing in today's workplaces. In virtual teams, the members can have different cultural backgrounds; they often work in different countries and are professionals in their own fields [36]. A virtual team has been emerging as an appealing, effective means to help organizations achieving their goals, because of its distinctive capabilities of overcoming traditional organizational barriers (e.g., cost, location, time, space, a lack of talents and expertise in an organization, etc.) to facilitate collaboration among different functions and establish strategic partnerships/alliances outside their boundaries [13]. While there is a growing body of research on knowledge and information economy issues and the changing sociology of work, empirical work specifically on virtual team operation is embryonic [16]. The unique aspects of virtual teams generate major barriers to their effectiveness. Are there ways in which these may be either overcome or mitigated?

Virtual teams present a new challenge to the concept and practice of leadership. The traditional ideas of leadership in teams are built on a foundation of face-to-face contact. Such leadership has a significant relational component, including building

A.M. Hadjiantonis and B. Stiller (Eds.): Telecommunication Economics, LNCS 7216, pp. 67–77, 2012.
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trust, handling conflict, and dealing with sensitive issues [47]. In light of the growing phenomenon of virtual teams, the traditional definition of "leadership" will be discussed, as part of the model that predicts the influence of the virtuality on leadership processes, social and tasks, that effect team output. Finally a methodology will be illustrated to examine the research model and a discussion of preliminary finding. The research will contribute a better understanding of virtual teams' leadership in hope of improving the teams work in the virtual world.

2 Literature Review

As the wired world brings everyone closer together, at the same time as they are separated by time and distance, leadership in virtual teams becomes even more important. Information technology makes it possible to build far-flung networks of organizational contributors, although unique leadership challenges accompany their formation and operation [10]. A review of "Leadership" and "Virtuality" as two main dimensions will be described in the next section.

2.1 Leadership

Leadership, particularly transformational and empowering leadership, improves team performance [38], yet it seems that leadership has an indirect impact on team performance. The literature implies that leadership can foster team performance through mediators. Schaubroeck [34] argued that transformational leadership influenced team performance through the mediating effect of team potency. The effect of transformational leadership on team potency was moderated by team power distance and team collectivism, such that higher power distance teams and more collectivistic teams exhibited stronger positive effects of transformational leadership on team potency. Kearney [21] had also suggests that transformational leadership can foster the utilization of the potential, but frequently untapped, benefits entailed by both demographic and informational/cognitive team diversity. Nemanich [27] argued that transformational leadership behaviors promote ambidexterity at the team level. They also found support for the association between transformational leadership and learning cultures. Shin [35] found that transformational leadership and educational specialization heterogeneity interacted to affect team creativity in such a way that when transformational leadership was high, teams with greater educational specialization heterogeneity exhibited greater team creativity.

Burke [6] indicated that specific leadership behaviors were generally related to team performance outcomes. Most notably, empowerment behaviors accounted for nearly 30% of the variance in team learning [6]. Srivastava [37] showed that empowering leadership was positively related to both knowledge sharing and team efficacy, which, in turn, were both positively related to performance.

Team-centric view of leadership raises many team leadership functions that help teams in the service of goal accomplishment [26]. It is reasonable that team dynamics is one of the major mediators that can improves team performance. Kanaga [19]

claimed that one of the dimensions of effective teams is positive internal relationships. Hultman [18] argue that deep teams (teams that surface implicit, intangible thoughts and feelings) will outperform shallow teams (teams that makes inference about explicit, tangible behavior without clarifying its accuracy) in terms of bottom-line results, because they have access to a more complete range of relevant information. Sarin [33] presented an examination of the effect of team leader characteristics on an array of conflict resolution behavior, collaboration, and communication patterns of teams. Their findings suggested that participative management style and initiation of goal structure by the team leader exert the strongest influence on internal team dynamics. Both these leadership characteristics had a positive effect on functional conflict resolution, collaboration, and communication quality within the team while discouraging dysfunctional conflict resolution and formal communications.

Leader behaviors are significant predictors of performance [1], apparently because team leaders often provide incentives for cooperation [15]. A challenging question is how different incentive schemes and their actual choice by the leader contribute to the team's success? Despite the increased work on leadership in teams, there is a lack of integration concerning the relationship between leader behaviors and team performance outcomes [6]. Burke [6] results indicate that the use of task-focused behaviors is moderately related to perceived team effectiveness and team productivity. Person-focused behaviors were related to perceived team effectiveness, team productivity, and team learning. Thamhain [41] claimed that while effective management of the technical aspects of the project is critical to success, team leaders must also pay close attention to managing relations across the entire work process, including support functions, suppliers, sponsors, and partners.

2.2 Virtuality

The virtuality level of a team has become an integral part of a team's definition [24]. Many variables are affected by the virtuality level of a team. Face-to-face team member are more cohesive [17], have stronger social ties [43], are more dedicated to the task and to other team members [30], have a stronger team identity [5] and have more affection to other team members [44], than in virtual teams. Strong social ties in virtual teams can be achieved but will take longer time than in face-to-face teams [8].

Many researchers have attempted to find the reasons why virtuality has a negative influence on team output: frequency and distance [12], the fact that team members are not familiar with one another [14], the difficulty in sharing information, and insufficient and confusing discussions [42]. Another group of researchers compared communication technologies, assuming that technology limits information [39]. The comparisons concluded that face-to-face teams are more efficient than teams using video [2], and video communication is more efficient than audio [7], adding text into video or audio communication improves performance [3], and satisfaction [29]. Maruping [25] show that teams tend to use different sorts of communication technologies for different kinds of interpersonal interactions.

2.3 Virtual Leadership

The issue of leadership in virtual teams is an increasingly important one for many modern organizations [9]. Getting a group of people to work successfully as a team - communicating effectively, establishing trust, sharing the load, and completing tasks on time - is difficult even when the team members are all in the same location. When team members are spread out in various locations, it presents new obstacles for the team leader [23]. Virtual teams rely on computer-mediated communication, and team members have to find ways to deal with leadership using relatively lean media. Virtual team interaction occurs across the boundaries of geography, time, culture, organizational affiliation and a whole host of other factors. Many questions relating to virtual team leadership arise, including how well team members can express roles across distance and time, and what the role of facilitators is in virtual teams [47]. As such teams communicate mainly through communication technology this raises the challenge for the team leader of how to unify the team and get the members to identify themselves with the team [36].

While the behavioral and trait approaches are dominant in explaining effective leadership, contingency leadership theories must be considered explaining effective virtual leadership. Purvanova [31] results suggest that transformational leadership has a stronger effect in teams that use only computer-mediated communication (in compare to traditional teams), and that leaders who increase their transformational leadership behaviors in such teams achieve higher levels of team performance. Konradt [22] showed that middle managers compared to line managers perceived people oriented leadership functions (i.e., mentor and facilitator roles) as important whereas line managers compared to middle managers perceived stability leadership functions (i.e., monitor and coordinator roles) as important. Nicholson [28] found that face-to-face and cross-cultural virtual team-members value different ingredients of leadership in different phases of the project.

Zaccaro [46] examined the similarities and differences between virtual teams and face-to-face teams. They suggest that affective processes include the expression of emotion by e-team members, as well as the management of these expressions. Eom [13] argued that trust is a key proxy for a virtual team's success, since trust enhances the performance of a virtual team. Carte [9] results suggest that high performing virtual teams displayed significantly more leadership behaviors over time compared to their low performing counterparts. Specifically, these teams displayed significantly more concentrated leadership behavior focused on performance (i.e. "Producer" behavior) and shared leadership behavior focused on keeping track of group work (i.e. "Monitor" behavior) than the lower performing teams.

There are aspects of virtual team leadership that may help overcome some of the potential process losses associated with virtual teamwork [11]. The most salient challenges for E-leaders of virtual teams are the difficulty of keeping tight and loose controls on intermediate progress toward goals [10]. Kayworth [20] suggest that effective team leaders demonstrate the capability to deal with paradox and contradiction by performing multiple leadership roles simultaneously (behavioral complexity). Specifically, it is discovered that highly effective virtual team leaders act

in a mentoring role and exhibit a high degree of understanding (empathy) toward other team members. Sivunen [36] study focuses on four virtual team leaders and their attempts to strengthen the team members' identification with the team through computer-mediated communication. The results show four different tactics employed in enhancing identification with the team: catering for the individual, giving positive feedback, bringing out common goals and workings and talking up the team activities and face-to-face meetings.

3 Research Model

The research model is depicted in Figure 1. According to the model the **virtuality level** is an affecting variable, while the measurable (dependent) variables are the outputs of the team work: **efficiency, effectiveness** and **satisfaction**. The **leader communication behaviors** are variable which mediate the relationship between Virtuality and Team's outputs.

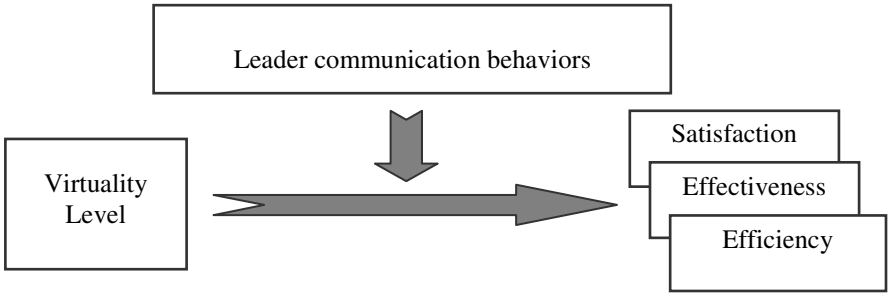

Fig. 1. Research Model

4 Research Hypotheses

- Hypothesis 1 – for an intellective task, social communication behaviors of face-to-face leaders are positive than social communication behaviors of virtual leaders.
- Hypothesis 2 – for an intellective task, social communication behaviors of virtual leaders are negative than social communication behaviors of face-to-face leaders.
- Hypothesis 3 – for an intellective task, task communication behaviors of face-to-face leaders include more answers than task communication behaviors of virtual leaders.
- Hypothesis 4 – for an intellective task, task communication behaviors of virtual leaders include more questions than task communication behaviors of face-to-face leaders.
- Hypothesis 5 – for an intellective task, face-to-face team's output is superior to a virtual team's output.

5 Methodology

An experiment was designed, in which a team task was delivered to 75 undergraduate students in an academic college. The subjects, who were grouped into teams of three members, had to share information in order to complete the task. Each team was given a task that takes approximately 30 minutes to complete. The research design is a Between Subjects Factorial Design: the factor is the type of communication: virtual vs. face-to-face. The research design includes a total of two experimental conditions. The virtual condition was implemented on 13 teams, while the Face-to-face condition was implemented on 12 teams, as described in Table 1. Thus, the experiment included 75 subjects (2 conditions * 12-13 teams * 3 subjects).

Table 1. Experimental Conditions

	Virtuality Level	N	Remarks
1	0	12	Face-to-face team
2	1	13	virtual team

5.1 Procedure

Subjects were invited in groups of three to meetings that were conducted using MSN-Messenger (virtual) or face-to-face (non virtual) communication. At the beginning of the meetings, the team members were asked to nominate a chairperson. The process of the experiment includes an intellective task. Each team member received a discrete and different piece of information, and only the aggregation of all the information revealed the whole "picture" and led to the correct solution.

5.2 Operationalization of Dependent Variables and Mediators

- ***Efficiency*** – the time required to complete the task.
- ***Effectiveness*** – the team's solution compared to the correct solution.
- ***Satisfaction*** – team members' reaction to the task will be measured by their understanding of communication, and satisfaction of medium, results and process.
- ***Leader communication behaviors*** – A textual (or audio) recording was saved for each virtual (or face-to-face) meeting. Task and social communication behaviors of leaders were measured by content analysis: The analysis, for each team leader (and actually for each team member) at any meeting, included the number of social positive phrases, social negative phrases, task question phrases and task answer phrases, accordingly to Bales [4] model. In order to use reliable measures, the phrase counting was done separately by two independent judges. The two judgment analysis was compared one to the other, and in a case of different decision (concerning the phrase category), a new agreed decision was taken.

Four measures were calculated out of the above phrases counting:

- Positive (Social) Leadership Level – Positive phrases percentage among all phrases of the leader during the meeting.
- Negative (Social) Leadership Level – Negative phrases percentage among all phrases of the leader during the meeting.
- Questions (Task) Leadership Level – Question phrases percentage among all phrases of the leader during the meeting.
- Answers (Task) Leadership Level – Answers phrases percentage among all phrases of the leader during the meeting.

Table 2 presents a summary of the Means and SD's of all the mediating variables above the experiment condition (Means and SD's by the independent variables are described in the following section).

Table 2. Means and SD's of the Mediator Variables (Overall N=25)

Mediator Variables	*M*	*SD*
Positive (Social) Leadership Level	18%	6%
Negative (Social) Leadership Level	8%	8%
Answers (Task) Leadership Level	52%	8%
Questions (Task) Leadership Level	21%	4%

Table 3 presents a summary of the Means and SD's of all the output variables above the experiment condition (Means and SD's by the independent variables are described in the following section).

Table 3. Means and SD's of the Output Variables (Overall N=25)

Output Variables	*M*	*SD*
Success (Effectiveness)	83%	28%
time (Efficiency)	33.32	13.63
Satisfaction	3.80	0.38

6 Findings

Twenty five experiments where preformed (out of the 50 planned) among undergraduate students in an academic college. Table 4 presents a summary of the Means and SD's by the independent variables. Table 5 presents a summary of the Means and SD's of all the output variables by the independent variables. A statistical analysis was performed. The T-Tests conducted compared communication behaviors of face-to-face leaders to communication behaviors of virtual leaders, and face-to-face team's output is to virtual team's output. The analysis indicates, for each hypothesis respectively:

Table 4. Means and SD's of the Mediator Variables by the independent variables

Mediator Variables	virtual leaders (N=13)		f-t-f leaders (N=12)	
	M	*SD*	*M*	*SD*
Positive (Social) Leadership Level	15.06%	4.69%	22.23%	4.32%
Negative (Social) Leadership Level	9.94%	11.71%	6.50%	2.29%
Answers (Task) Leadership Level	21.80%	5.47%	19.84%	3.19%
Questions (Task) Leadership Level	21.80%	5.47%	19.84%	3.19%

Table 5. Means and SD's of the Output Variables by the independent variables

Output Variables	virtual leaders (N=13)		face-to-face leaders (N=12)	
	M	*SD*	*M*	*SD*
Success (Effectiveness)	86.54%	26.25%	78.47%	29.40%
time (Efficiency)	41.85sec	12.55sec	24.08sec	8.46sec
Satisfaction	3.66	0.45	3.96	0.26

- H1 – social communication behaviors of face-to-face leaders are positive than social communication behaviors of virtual leaders ($t = 3.96 ; p < 0.05$).
- H2 – social communication behaviors of virtual leaders are not negative than social communication behaviors of face-to-face leaders.
- H3 – task communication behaviors of face-to-face leaders does not include more answers than task communication behaviors of virtual leaders.
- H4 – task communication behaviors of virtual leaders does not include more questions than task communication behaviors of face-to-face leaders.
- H5 – face-to-face team's output is partially superior to a virtual team's output: face-to-face teams are not successful than virtual teams in completing the task, yet for virtual teams it takes longer time in carrying out the task ($t = -4.11 ; p < 0.05$) and the virtual teams members are lees satisfied ($t = 2.04 ; p < 0.05$).

7 Discussion

Collaboration in distributed settings has become a reality in organizational life, while information flows freely across organizational, geographic, and cultural borders. More and more organizations are adapting the solution of e-teams - teams that can span distances and times to take on challenges that most local and global organizations must address [46]. This experimental study examined leadership in the context of traditional teams using face-to-face communication and virtual teams using computer-mediated communication, in order to check what leadership functions are necessary to promote virtual team success and performance, in light of Horwitz [16] claims about the importance of leadership communication to virtual team performance.

The results shows that face-to-face team's output is partially superior to a virtual team's output: while face-to-face and virtual teams are equally successful in completing the task, virtual teams takes longer time in carrying out the task and their members are lees satisfied.

Three out of four hypotheses concerning the team leader communication behaviors were refuted: social communication behaviors of virtual leaders are not negative than social communication behaviors of face-to-face leaders; task communication behaviors of face-to-face leaders does not include more answers than task communication behaviors of virtual leaders and; task communication behaviors of virtual leaders does not include more questions than task communication behaviors of face-to-face leaders.

Yet, it is possible that the significant difference between social communication behaviors of face-to-face leaders and virtual leaders can act as an explanation for the increased face-to-face team's output in compare to the virtual team's output. The results indicate that social communication behaviors of face-to-face leaders are positive than social communication behaviors of virtual leaders. Existing theory and research reveals that constructive management behaviors are important to teams' success. Wolff [45] contributes to existing theory by proposing that empathy precedes and enables those cognitive processes and skills by providing an accurate understanding of team and member emotions and needs. Rego [32] suggest that emotionally intelligent leaders behave in ways that stimulate the creativity of their teams. Tansley [40] showed that trust is a necessary pre-condition for the development and exploitation of social capital, a significant influence on project success.

Though the findings are, in general, consistent with the existing literature, it strengthens the importance of positive social communication behavior as a specific leadership communication behavior, rather than any other type of behavior. It also implies that leadership positive social communication behavior can explain the difference between face-to-face team's outputs in compare to the virtual team's output.

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